

## RIVERS AND FLOODS, JANUARY, 1911.

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There were two important floods during the month, one in the Ohio River and the other in the rivers of California. Both were in progress at the end of the month, and reports thereof will be deferred until the next issue of the Review.

There were several floods of minor importance. On January 1 and 2 heavy rains fell in the East Gulf States and along both slopes of the southern Appalachians, and by the morning of January 2 all rivers of that section were rising rapidly. On the morning of January 3 flood warnings were issued for the Tennessee River at Florence, Ala. The warnings were repeated on the following morning and extended to the mouth of the river. In the vicinity of Florence and Riverton, Ala., the crest stages were a foot or two above the flood stage, while below they closely approximated it. Owing to the distribution of the rainfall with respect to the time of occurrence, the crest at Florence occurred on the same day as at Chattanooga and one day earlier than at points between. No warnings were necessary above Florence, the crest stage at Chattanooga on January 5 having been about 8 feet below the flood stage. The losses amounted to about \$750, of which about \$500 was in property, while the remainder was due to suspension of business. The value of property saved by the Weather Bureau warnings was about \$2,500.

The rivers of the Santee system did not reach flood stage, although on January 5 the stage at Camden, S. C., on the Wateree River, was 23 feet, or only 1 foot below flood stage.

There was a moderate flood in the lower Roanoke River, with a crest stage of 35.2 feet, or 5.2 feet above flood stage, at Weldon, N. C., on January 5. Warnings were issued on January 4, and no damage was reported.

Rises in the Alabama River and tributaries were also pronounced, but no floods occurred. The Black Warrior and lower Tombigbee Rivers were high, owing to the very heavy precipitation over the headwaters of the former river, and warnings were first issued on January 2. On January 3 warnings were issued for a 55-foot stage at Tuscaloosa, Ala., on the Black Warrior River, and for a stage exceeding 43 feet at Demopolis, Ala., on the Tombigbee, flood stages being at 43 and 35 feet, respectively. A crest stage of 52 feet was reached near midnight of January 3-4 at Tuscaloosa, and of 41.9 feet at Demopolis on January 9 and 10. Lowlands were flooded, but the only loss of consequence was of raft timber to the value of about \$1,000. Cattle to the value of \$30,000 were removed from the lowlands as a result of the warnings, and timber of about the same value was moved to the mills.

In the Pascagoula and Pearl River watersheds of Mississippi flood stages were generally exceeded by amounts ranging from a fraction of a foot to nearly 6 feet. Defective telegraph service prevented the issue of warnings until the morning of January 3, but, with a single exception, the crest stages did not occur until more than 24 hours after. The warnings were in ample time to permit the removal of stock to places of safety, and the only losses of consequence were those of a quantity of logs in the lower Pearl River, valued at perhaps \$2,500.

The ice that moved out on December 29, 1910, from the upper West Branch of the Susquehanna lodged near Pine, Pa., 7 miles below Lock Haven, where it remained for over two weeks. Warm and moderately heavy rains on January 13 and 14 started a decided rise in the river and in Bald Eagle Creek, and by the night of January 14 all the bottom lands between Pine and Lock Haven, including the lower portion of the city of Lock Haven, were under water. The water continued to rise until the following morning, when the gorge broke. The gorge above the dam at Williamsport broke at 10 a. m. of the same date, and at 3 p. m. the river reached a stage of 19 feet, 1 foot below the flood stage. At Lock Haven the stage is said to have been the highest since 1894, and the major portion of the damage appears to have been done in this vicinity. The ice reached Harrisburg, Pa., on the main stream, during the early morning of January 16, with 11.5 feet of water, and finally lodged against the ice jam that at that time extended from the McCall Ferry Dam to Columbia, Pa. The ice began to run over the McCall Dam on January 15, but on the 19th another large gorge formed opposite Pequea, Pa. After January 20 there was no further movement of the ice in the vicinity of the McCall Ferry Dam, and the month closed with an immense quantity of ice above the dam threatening another flooding with the next general rise in the rivers.

There was a moderate flood in the upper Ohio River from January 14 to 17, caused by warm and moderate rains and melting snows, and the usual warnings were issued for a rise to a foot or two above flood stage. At Pittsburg the crest stage was 23.8 feet on January 15, 1.8 feet above the flood stage, and at Wheeling, W. Va., 36.1 feet, 0.1 foot above the flood stage. Cold weather on the 15th and 16th checked the rise to such an extent that the crest stage at Parkersburg was only 34.8 feet, 1.2 feet below the flood stage. The losses and damage amounted to about \$25,000, mostly in the vicinity of Pittsburg, and of this \$15,000 was in property and the remainder through suspension of business. The property saved as a result of the Weather Bureau warnings was valued at about \$100,000.

Some minor floods also occurred in the interior rivers of the State of Ohio, due mainly to ice gorges. Warnings were issued promptly and no damage was reported.

The rise in the Wabash River and tributaries was not of special importance, although the stage of 14.6 feet at Mount Carmel, Ill., on January 19 was but 0.4 foot below the flood stage. Warnings for this rise were issued on January 16.

On January 10 and 11 general and copious rains over Arizona, especially over the central and northern portions, were followed by a rapid run-off in the various streams. On the morning of January 12 the Salt River at Tempe, Ariz., reached a stage of 8.2 feet, and the stream did not become fordable until January 20. There was also a considerable rise in the Gila River at the same time. Accurate warnings of these rises were issued on January 11, and they were of special value to the irrigation and engineering interests. The rise was not sufficient to reach the farm and ranch lands. The losses of all kinds

from the rise did not exceed \$1,000, while property to the value of about \$12,500 was saved by the warnings.

The last local flood of the month occurred in the Willamette Valley from January 19 to 23, inclusive, and was caused by warm and heavy rains on January 17 and 18 falling upon a considerable quantity of fresh snow that had fallen during the previous week. The Yamhill River was quite high, but in the remaining tributaries and in the main stream only moderate flood stages prevailed. A peculiar phase of the flood was the almost simultaneous occurrence of the crest stages in both the tributaries and the main stream. This was due to the deficient run-off from upstream points, the lower tributaries raising the main stream to the bank-full stage, and the water from the upper ones arriving in time to cause only a further slight rise. Accurate forecasts for this flood were necessarily difficult, and the moderate tone of the warnings prevented a large amount of unnecessary work. No losses were reported, except of a few bridges in the country districts.

On January 18 advisory warnings of rapid rises in the mountain streams of the State of Washington were also issued. These warnings were to the effect that the floods would not be severe unless still heavier rains should fall.

Ice conditions did not change materially during the month, except in Minnesota and North Dakota, where the comparatively low mean temperatures were accompanied by a considerable increase in the thickness of the ice. The

maximum thickness reported was 33 inches at Bismarck, N. Dak., at the end of the month.

Reports from mountain snowfall stations in the West showed an improvement in conditions, but nothing unusual except in California, where the fall was excessive. In many places in California the total fall of snow was over 200 inches, and at Tamarack, in Alpine County, a fall of 400 inches was reported, of which 310 inches remained at the end of the month. At Summit, in Placer County, 283 inches fell, of which 218 inches remained at the end of the month. Streams were bank full and there was an abundance of water in sight.

On January 1, 1911, the new river district of Iola, Kans., was established, with territory comprising that portion of the watershed of the Neosho River from Neosho Rapids northward, and the river district of Fort Smith, Ark., curtailed accordingly. The change was made in order to facilitate the reception and dissemination of river information regarding the upper Neosho River.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

## SPECIAL PAPERS ON GENERAL METEOROLOGY.

### RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

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The following have been selected from among the titles of books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Anonymous publications are represented by a —.

#### Aiginētēs, Dēmētrios.

*Πρακτικὴ μετεωρολογία* . . . 2d. ed. 'Εν' Ἀθήναις. 1909. 191 p. 8°. Carnegie institution of Washington.

Yearbook, 1910. v. 9. Washington. 1911. xvi. 238 p. 4°.

#### Chemulpo (Korea). Meteorological observatory.

Scientific memoirs. v. 1. Chemulpo. 1910. v. p. 4°.

#### Eiffel, G.

*Atlas météorologique pour l'année 1909*. Paris. 1910. v. p. f°.

#### Finch, William Coles-

Water, its origin and use. New York. 1909. xxi. 483 p. 8°.

#### Gruner, P.

*Dämmerungserscheinungen und Alpenglühen beobachtet in Bern*. 1910. (Separat-Abdruck aus den Mitteil. d. Naturf. Gesell. Bern, 1910.)

#### Hastings, Milo M.

Cold-storage evaporimeter. Washington. 1909. 8 p. 8°. (U. S. Bureau animal industry. Circ. 149.)

#### Heiskell, Henry L.

Instructions to the marine meteorological observers of the U. S. Weather bureau. 3d. ed. Washington. 1910. 68 p. 8°. (W. B. No. 444.)

#### Hopkins, N. Munroe.

Standard lightning protection for the consolidated power-plant chimneys at United States navy yards. (Reprinted: Jour. Amer. soc. naval eng., v. 29, No. 2, p. 383-405.)

#### 11th International geological congress, Stockholm, 1910.

*Die Veränderung des Klimas seit dem Maximum der letzten Eiszeit*. . . . Stockholm. 1910. lviii. 459 p. 4°.

#### International meteorological committee.

Report . . . Commission on maritime weather signals. . . . Appendix 2.—Provisional summary of maritime weather signals at present in use in the various countries of the globe. [2d ed.] London. 1911. 21 p. 8°. (M. O. No. 206.)

#### McAdie, Alexander [George].

Notes on frost . . . 2d. ed. Washington. 1910. 32 p. 8°. (U. S. Department of agriculture. Farmers' bull. 104.)

#### Marvin, Charles Frederick.

Measurement of precipitation. Instructions on the measurement and registration of precipitation by means of the standard instruments of the U. S. Weather bureau. Circular E, Instrument division. 3d. ed. Washington. 1910. 39 p., 10 figs. 8°. (U. S. Weather bureau. No. 445.)

#### Mysore. Meteorological department.

Rainfall registration in . . . 1909. Bangalore. 1910. 47 p. 4°.

#### Negro, Carlo.

*Sulla elettricità e radioattività della precipitazione atmosferica*. Roma. 1910. 33 p. 4°. (Estratto: Mem. Pontif. accad. Romana d. Nuovi Lincei. v. 28.)

#### Observatorio de Madrid.

Anuario, 1911. Madrid. 1910. 690 p. 12°.

#### Prussia. K. Preussisches aeronautisches Observatorium bei Lindenberg.

*Ergebnisse der Arbeiten* . . . 1909. Bd. 5. Braunschweig. 1910. xxxvi. 248 p. f°.

#### Rizzò, G. B.

*Relazione sul terremoto di Messina e della Calabria nel 28 dicembre 1908*. Roma. 1909. p. 157-161. 4°. (Estratto: Relazione della Comm. r. incaricata di designare le zone più adatte per la ricostruzione . . .)

*Sulla propagazione dei movimenti prodotti dal terremoto di Messina del 28 dicembre 1908*. Torino. 1910. 63 p. f°. (Estratto: Mem. r. Accad. delle sci. Torino. Serie 2, Tom. 61: 355-417.)

#### Rømer, Ole.

. . . Adversaria. Med understøttelse af Carlsbergfondet udgivne af det K. Danske videnskabernes selskab . . . København. 1910. 271 p. 4°. [Latin, index in French.]

#### Solvay, Ernest.

*De la condensation électrique dans l'atmosphère*. Bruxelles. 1907. 19 p. 8°. (Reprinted: Ciel et terre, 1907. 28.)

#### St. Petersburg. Imperial forestry institute.

*Observations de l'observatoire météorologique* . . . 1907. [Title page in Russian and French.] Sankt Peterburg. 1909. xi, 67 p. f°.

#### Talman, Charles Fitzhugh.

Brief list of meteorological textbooks and reference books. 2d. ed. Washington. 1910. 18 p. 8°.

#### Wamsler, Friederich.

*Die Wärmeabgabe geheizter Körper an Luft*. München. 1909. 83 p. 4°. (Diss.—Technische Hochschule, München.)

#### Wells, Edward L.

*Climate of Idaho* [with tables of annual precipitation, 1891 to 1909.] (In Biennial report of the state engineer, v. 8, 1909-1910) [Boise]. [1910]. p. 193-197. 8°.